

## Preliminary phytochemical screening of foliar extract of *Anthocephalus cadamba* (Roxb.)

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### Abstract

*Anthocephalus cadamba* (Roxb.) is one of the important medicinal plant belongs to family Rubiaceae and contain vast number of phytochemicals which are naturally synthesized in all parts of the plant. The present study was carried out for phytochemical screening of its foliar extract. Shed dried leaves were grinded and used for the extraction by soxhlet method using various solvent i.e petroleum ether, chloroform, methanol, ethanol and distilled water. Phenols were present in chloroform, methanol and ethanol extract whereas tri- terpenoids in petroleum ether, chloroform, and ethanol extract. Saponins were present in chloroform, methanol and distilled water extract. Tannins were found to be present in chloroform and ethanol extract. Carbohydrates, flavanoids and steroids were present in only ethanol extract, distilled water and methanol extract respectively. It was also observed that all the extract does not contain amino acid, protein and alkaloids. Among the selected solvent chloroform extract (saponins, tannins, tri-terpenoids and phenol) and ethanol extract (carbohydrates, tannins, tri-terpenoids and phenol) revealed the presence of maximum number of phytochemicals. The leaves of *Anthocephalus cadamba* posses various potent phytochemicals and is recommended for further phytopharmaceutical importance.

**Keywords:** *Anthocephalus cadamba*, phytochemical, soxhlet, phytopharmaceutics

### Introduction

Growing interest of industries and researches in chemical composition of plant based medicines. Several bioactive constituents of different plants i.e phytochemicals have been isolated and studied for pharmacological activities. Phytochemicals are the chemicals produces by various parts of the plants. These bioactive constituents can be steroids, terpenoids, carotenoids, flavonoids,

alkaloids, tannins and glucosides, saponin, phenols and tri-terpenoids.

*Anthocephalus cadamba* (Roxb.) is one of the important medicinal plants found in all parts of India. It is found at low levels of wet places. It belongs to Rubiaceae family and also known as wild cinchona <sup>[1]</sup>. It is cultivated in all over India. Leaves are about 7.5-18 \* 4.5-16 cm in size. They are glossy green in colour, opposite more or less

sensible to petiolate, ovate to elliptical (15-50\*8-25). Flowers are bisexual, funnel shaped, sweetly fragrant, orange or yellow in color. Bark is grey, smooth in young trees and rough in old trees <sup>[6,7]</sup>.

Several researches show the strong evidence of presence of amino acid, saponins, triterpenoids, terpenoids, steroids, carotenoids, flavonoids, alkaloids, tannins, phenols, and glucosides present in its bark <sup>[12]</sup>. Leaves also contains phytochemical like cadambagenic acid, cadamine and quinovic acid whereas Seed contains xylose, mannose and glucose <sup>[7,4]</sup>. These bioactive compounds are frequently used in many folk medicines in the treatment of fever, anemia, skin infection and dysentery <sup>[4]</sup>. This plant is effective in lowering of blood glucose levels shows in various studies. Recent researches also reported antifungal and antibacterial activity of various parts of the plant <sup>[9]</sup>. The present investigation is carried to screen the presence of different phytochemicals in leaves of Cadamba plant.

### **Materials and methods**

The study was conducted in January - July 2017 in ITM university Gwalior Madhya Pradesh. Fresh and disease free leaves of *Anthocephalus cadamba* were collected from the botanical garden and used for extraction. Collected leaves were washed with distilled water and shed dried at room temperature. The shed dried leaves were grinded and stored in air-tight container for the further use. Five different solvents such as petroleum ether, chloroform, ethanol, methanol and distilled water were used for the extraction using soxhlet method. Foliar extract of *Anthocephalus cadamba* in all the five extracts were tested for the presence of various bioactive compounds by following standard methods <sup>(3,5,8)</sup>

### **Alkaloids**

Alkaloids were tested by Mayer's test- Few drops of mayer's reagent (1.36gm of Mercuric chloride and 5gm of Pottassium iodide in 100ml distilled water) was added in 2-3 ml of test extract. Appearance of cream colour is observed in the sample. This change in colour indicated the presence of alkaloid.

### **Carbohydrates**

Carbohydrate was tested by using Molish test. Few drops of Molish reagent (10gm  $\alpha$ -naphthol in 100ml 95% alcohol) were added in 2-3 ml of test sample. Then few drops of concentrated sulphuric acid were mixed with it through the wall of the test tube. Formation of purple- violet colour ring at the junction indicated the presence of carbohydrates.

### **Amino acid**

Two millilitre Million's reagent (Mercuric nitrate) was added with 2-3 ml of test sample. Formation of white precipitate indicated that amino acids are present in the sample extract.

### **Protein**

Presence of protein was tested by Warming test. For this 2-3 ml of test sample was heated in boiling water bath. Coagulation of extract after heating indicated the presence of protein in the sample.

### **Saponin**

Saponin content was tested by Forth formation test. For this 2 ml of test extract was shaken vigorously with distilled water in a test tube. Persistent foam formed at the surface indicated the presence of saponin in the extract.

### **Flavonoids**

Flavonoids were tested by performing Alkaline reagent test. Few drops of sodium hydroxide solution were added in 2 ml of test extract. Instance yellow colour formed

which turned into colour less solution on addition of few drops of dilute acid ( $H_2SO_4$ ). This change indicate extract possess the flavonoids in it.

### Tannins

Tannins were tested by performing Gelation test. Two millilitre of test extract and 1% gelatine solution containing 10% sodium chloride were mixed in a test tube. Formation of precipitate indicated the presence of tannins.

### Steroids and tri-terpenoids

Steroids and tri-terpenoids were tested by Salkowski test. Two millilitre of test extract was mixed with few drops of concentrated sulphuric acid. Formation of red colour at the lower level indicated the presence of steroids whereas yellow colour indicated the presence of tri-terpenoids in the extract.

### Phenol

Two millilitre of test extract was treated with 2 ml of 5% ferric chloride solution. Formation of blue colour indicated the presence of phenol.

### Results and discussion

The present phytochemical study of *Anthocephalus cadamba* leaves extracts was studied for the five different solvent extracts with increasing polarity. The results of qualitative phytochemical analysis conducted on *Anthocephalus cadamba* foliar extract indicated the presence of different phytochemicals in various extract viz. petroleum ether, chloroform, methanol, ethanol and distilled water. Ten phytoconstituents i.e alkaloids, flavonoids, saponins, tannins, steroids, tri-terpenoids, phenols, amino acid, proteins and carbohydrates were tested in above mentioned extract which revealed the presence of maximum phytochemical in ethanol foliar extract. Carbohydrates were

present in ethanol extract which also support the result of Usman et.al (2012) and Padalkar et al. (2013).

Phenolic content was regularly present in approximately all the extracts except in petroleum ether and distilled water<sup>[2]</sup>. Saponin shows a tremendous variation regarding their presence as it was present in chloroform, methanol, ethanol and distilled water. In case of tannins the extracts of chloroform, methanol and distilled water indicate its presence. The result of tannins and saponins was strongly convinced by Acharyya et.al (2010) and Padalkar et. al (2013). Saponins and tannins are very important bioactive compound in plants, which have strong anti-cancer properties<sup>[13]</sup>. Alkaloids, amino acid and protein could not found in any of extracts (Usman et. al 2012 and padalkar et.al 2013). Flavonoids are screened only in distilled water (Achryya et. al 2010). Presence of flavonoids enriches its pharmaceutical value as flavonoids are used as anti-inflammatory, anti-cancer and anti-viral properties<sup>[10]</sup>. Tri-terpenoids were present in various solvents like petroleum ether, chloroform and ethanol. Steroid was present only in methanolic extract<sup>[2]</sup>. These findings show that leaves offers a wide array of phytochemicals.

### Conclusion

Research on medicinal plant is the subject of great interest recently, which is the reason to explore the medicinal importance of this plant. The present study concludes about the different phytochemicals present in foliar extract of *Anthocephalus cadamba* by using various solvent. The presence of various bioactive compounds has justified the use of *Anthocephalus cadamba* leaves extract for various ailments by traditional practitioners. The study also supports the view that the plant has the ability to overcome many incurable diseases such as diabetes, anemia and various skin diseases.

**Table 1: Phytochemical analysis of different solvent extracts in leaves of *Anthocephalus cadamba*.**

Phytoconstituents	Petroleum Ether	Chloroform	Methanol	Ethanol	Distilled Water
Alkaloids	-	-	-	-	-
Amino acid	-	-	-	-	-
Carbohydrate	-	-	-	+	-
Flavonoids	-	-	-	-	+
Saponins	-	+	+	-	+
Tannins	-	+	-	+	-
Protein	-	-	-	-	-
Steroids	-	-	+	-	-
Tri-terpenoids	+	+	-	+	-
Phenol	-	+	+	+	-

‘+’=positive ‘-’=negative

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